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CASE REPORT

Screening and Diagnostic Strategies for Sarcomatoid Carcinoma of the Pancreas

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ABSTRACT

Background: **Sarcomatoid carcinoma of the pancreas (SCP) is an exceptionally rare variant of pancreatic ductal adenocarcinoma. A detailed evaluation of its clinical manifestations, laboratory findings, and imaging characteristics may contribute to earlier detection and intervention, thereby improving survival outcomes and quality of life.**

Methods: **We retrospectively reviewed the clinical presentation, laboratory investigations, and imaging findings of a patient with pathologically confirmed SCP. In addition, relevant literature was analyzed to summarize strategies for early screening and diagnosis.**

Results: **A 78-year-old female presented with persistent dull epigastric pain accompanied by nausea and vomiting. Laboratory evaluation revealed elevated CA19-9 levels. Imaging demonstrated a mass in the pancreatic body and tail. Dynamic contrast-enhanced CT showed moderate heterogeneous enhancement in the arterial phase with progressive enhancement during the portal venous phase. Dynamic contrast-enhanced MRI revealed rim enhancement.**

Conclusions: **The integration of serum CA19-9 measurement with characteristic imaging features may facilitate the early identification of SCP.**

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KEYWORDS

pancreas, sarcomatoid carcinoma, carbohydrate antigen19-9, computed tomography, magnetic resonance imaging

INTRODUCTION

Sarcomatoid carcinoma of the pancreas (SCP) is an uncommon histological variant of pancreatic ductal adenocarcinoma (PDAC), accounting for only 2 - 3% of PDAC and its subtypes. It originates from the pancreatic ducts and acini and is characterized by high malignancy, rapid progression, and poor prognosis [1,2]. Owing to its extreme rarity, reports on screening and diagnostic strategies for SCP are limited to single-case descriptions. Here, we present a case of surgically and pathologically confirmed SCP, with a detailed analysis of its clinical presentation, laboratory parameters, and imaging characteristics, and provide a literature review to summarize potential approaches for early screening

and diagnosis.

CASE PRESENTATION

Written informed consent was obtained from the patient and her immediate family. The patient was a 78-year-old woman who was admitted with a chief complaint of persistent dull epigastric pain accompanied by nausea and vomiting after ingestion of fatty food. Physical examination revealed a soft abdomen with localized tenderness in the upper abdomen, but no muscle guarding, rebound tenderness, or palpable abdominal mass. Laboratory investigations showed an elevated carbohydrate antigen 19-9 (CA19-9) level of 35.39 U/mL, whereas other tumor markers, routine blood tests, coagulation profile, and biochemical parameters were unremarkable. Contrast-enhanced abdominal CT revealed a cystic lesion in the pancreatic body and tail, suggestive of intraductal papillary mucinous neoplasm with malignant potential. Subsequent MRI demonstrated an irregular, nearly round lesion with slightly hypointense signal on T1-weighted imaging, mixed slightly hypo- and hyperintense signals on T2-weighted imaging, hyperintense signal at the periphery and hypointense signal centrally on diffusion-weighted imaging (DWI), and rim enhancement on dynamic contrast-enhanced scanning. The lesion showed poorly defined margins with the splenic artery and vein (Figure 1).

The patient subsequently underwent surgical resection under general anesthesia. Intraoperatively, a firm mass measuring approximately 5.0 x 4.0 cm was identified in the pancreatic body and tail, with invasion into the splenic vein and posterior gastric wall. Therefore, a distal pancreatectomy with splenectomy and partial gastric resection was performed. Postoperative pathology confirmed pancreatic carcinoma with negative resection margins. Microscopic examination revealed extensive necrosis with only a few markedly atypical cells. Immunohistochemistry demonstrated loss of multiple epithelial markers, suggesting a diagnosis of high-grade sarcoma, although no definitive line of differentiation was identified. Immunohistochemical staining results were as follows: CK (pan) (-), CD34 (-), CD117 (-), Dog-1 (weak +), SMA (weak +), DES (weak +), S100 (-), SOX10 (-), Ki-67 (50% +), CDK4 (-), MDM2 (-), P16 (-), CD99 (weak +), BCL-2 (weak +), ALK (-), β-catenin (cytoplasmic +) (Figure 2).

DISCUSSION

Sarcomatoid carcinoma is a biphasic malignant neoplasm that arises when a malignant epithelial tumor develops sarcomatoid components, such as spindle cells, without distinct heterologous sarcomatous elements [3]. Its occurrence in the pancreas is exceedingly rare. The first reported case of SCP dates back to 1961. SCP predominantly affects men over the age of 50. Due to its high malignancy, rapid progression, and aggressive behavior, most patients present with upper abdominal symptoms or rapid weight loss at an advanced stage, often with involvement of adjacent organs or regional lymph nodes [4]. As a rare variant of pancreatic ductal adenocarcinoma (PDAC), SCP lacks specific biomarkers, which poses considerable challenges for early screening and diagnosis. Consequently, detailed evaluation of laboratory parameters and imaging features, in addition to clinical manifestations, is of significant diagnostic value.

In the present case, laboratory investigations revealed only a mild elevation of carbohydrate antigen 19-9 (CA19-9), while other parameters were within normal limits. This finding is consistent with Li et al. [5], who reported a 75-year-old male patient with SCP exhibiting a slight increase in CA19-9 (46.86 U/mL). Rhodes [6] proposed that early vascular invasion in pancreatic carcinoma induces secretion of mucin antigens, including CA19-9, which correlates with tumor size and the presence of distant metastases, and may therefore serve as a marker for screening, diagnosis, and prognosis of pancreatic cancer [7]. As a sensitive tumor marker in the digestive system, CA19-9 elevation provides useful reference for the diagnosis of pancreatic and hepatobiliary tumors. Feng et al. [8] retrospectively analyzed 23 cases of undifferentiated sarcomatoid carcinoma of the pancreas (USCP) at West China Hospital, Sichuan University, reporting elevated CA19-9 levels in 18 patients (78.26%).

Beyond laboratory findings, SCP is characterized by a range of distinctive imaging features. In this case, CT imaging revealed a mass-like soft tissue lesion in the pancreatic body and tail, consistent with the common anatomical predilection of SCP [9], but notably different from pancreatic ductal adenocarcinoma, which typically arises in the pancreatic head. The lesion measured approximately 5.0 x 4.0 cm, relatively large in size and comparable to nonfunctional pancreatic neuroendocrine tumors, which are usually sizeable. This may be attributed to the fact that the pancreatic body and tail are surrounded by adipose tissue and situated within a relatively spacious retroperitoneal compartment [10]. In this patient, the lesion involved adjacent structures, including the splenic artery, splenic vein, and the lesser curvature of the stomach, consistent with previous reports indicating that SCP frequently invades neighboring organ [11]. This feature contrasts with solid pseudopapillary tumors, which rarely exhibit invasion of surrounding tissues or evidence of metastasis. On contrast-enhanced CT, the mass demonstrated moderate enhancement. Zhu et al. [12] reported that SCP typically exhibits the lowest enhancement in the arterial phase and the highest enhancement in the portal venous phase. By contrast, the present case showed heterogeneous moderate enhancement during the arterial phase and progressive enhancement during the portal venous phase. This discrepancy may reflect differences in tumor differentiation, as poorly differentiated tumors often contain abundant stromal

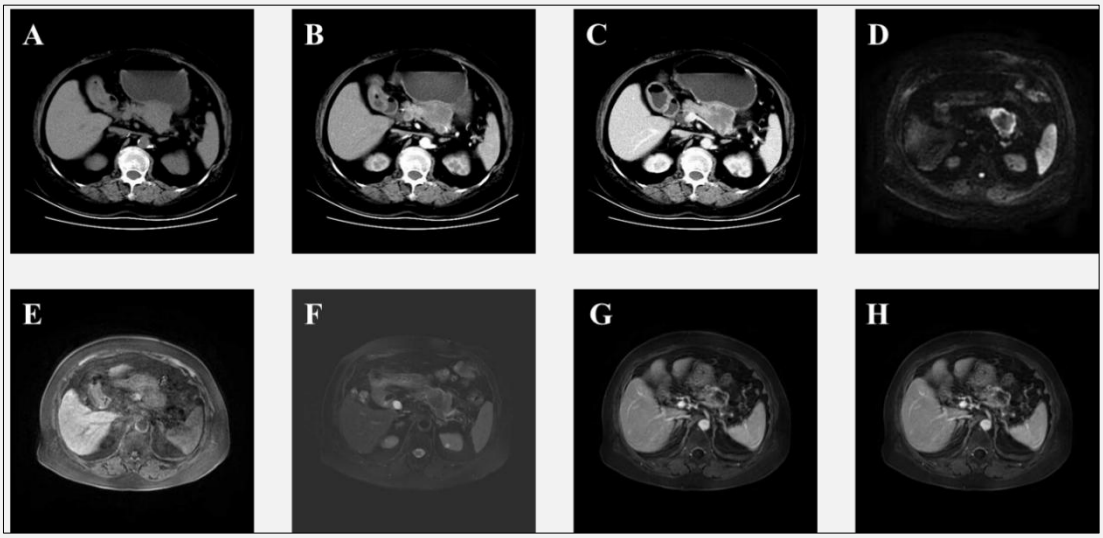

Figure 1. Imaging examinations of the patient with SCP.

A: Non-contrast CT, B: Contrast-enhanced CT, arterial phase, C: Contrast-enhanced CT, portal venous phase, D: DWI, E: T1-weighted image, F: T2-weighted image, G: Contrast-enhanced MRI, arterial phase, H: Contrast-enhanced MRI, portal venous phase.

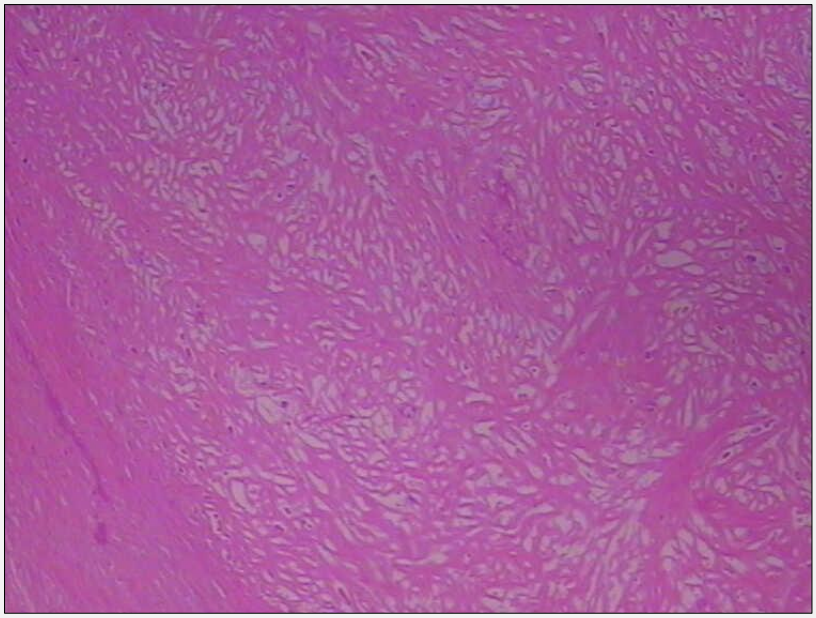

Figure 2. Histopathological examination of the SCP patient.

Light microscopy demonstrates abundant atypical cells, some of which exhibit spindle-shaped morphology (H&E, x 100).

fibrosis, resulting in prolonged contrast retention. MRI further revealed that the tumor was slightly hypointense on T1-weighted imaging, likely due to the lack of proteinaceous components, while T2-weighted imaging demonstrated mixed hypo- and hyperintense signals, consistent with high-grade malignancy. Diffusion-weighted imaging showed peripheral hyperintensity and central hypointensity, in line with findings reported by Lu et al. [13]. Contrast-enhanced MRI proved valuable for evaluating local invasion, with the lesion displaying peripheral enhancement and poorly defined borders with the splenic artery and vein. Compared with pancreatic ductal adenocarcinoma, SCP appears to be more richly vascularized [14].

This study has inherent limitations. Given the rarity of SCP, series-level data for comprehensive evaluation of laboratory and imaging features are lacking. Future multicenter studies with larger sample sizes are needed to identify more reliable markers for early screening and diagnosis.

In conclusion, SCP may present with a sensitive laboratory marker, CA19-9, along with characteristic imaging features. The presence of elevated CA19-9 in combination with distinctive imaging findings should raise suspicion for SCP, although definitive diagnosis still relies on pathological confirmation.

Declaration of Interest:

The authors have no conflicts of interest to declare that are relevant to the content of this article.

References:

1. Kašperová B, Jurišová S, Macúch J, et al. Undifferentiated Carcinoma of the Pancreas - a Case Report. Klin Onkol 2018;31:453-6. (PMID: 31035768)

2. Zhou DK, Gao BQ, Zhang W, Qian XH, Ying LX, Wang WL. Sarcomatoid carcinoma of the pancreas: A case report. World J Clin Cases 2019;7:236-41. (PMID: 30705901)

3. Harada Y, Sakai A, Ikegawa T, Shiomi H, Masuda A, Kodama Y. Pancreatic Sarcomatoid Carcinoma With Intraductal Growth Protruding From the Papilla of Vater. Am J Gastroenterol 2022;117: 1900. (PMID: 35971239)

4. Alguacil-Garcia A, Weiland LH. The histologic spectrum, prognosis, and histogenesis of the sarcomatoid carcinoma of the pancreas. Cancer 1977;39:1181-9. (PMID: 912652)

5. Li P, Zhang L, Liang J, Tuo HF. A sarcomatoid carcinoma in the pancreas tail: A case report with literature review. Asian J Surg 2024;47:2349-51. (PMID: 38331612)

6. Rhodes JM. Usefulness of novel tumour markers. Ann Oncol 1999;10 Suppl 4:118-21. (PMID: 10436801)

7. Forsmark CE, Lambiase L, Vogel SB. Diagnosis of pancreatic cancer and prediction of unresectability using the tumor-associated antigen CA19-9. Pancreas 1994;9:731-4. (PMID: 7846016)

8. Feng L, Tang X, You Z. Undifferentiated sarcomatoid carcinoma of the pancreas-a single-institution experience with 23 cases. BMC Cancer 2024;24:250. (PMID: 38389041)

9. Toledo PF, Berger Z, Carreño L, Cardenas G, Castillo J, Orellana O. Sarcomatoid carcinoma of the pancreas - a rare tumor with an uncommon presentation and course: A case report and review of literature. World J Clin Cases 2021;9:3716-25. (PMID: 34046475)

10. Fujiogi M, Kobayashi T, Yasuno M, Tanaka M. Anaplastic carcinoma of the pancreas mimicking submucosal gastric tumor: a case report of a rare tumor. Case Rep Med 2013;2013:523237. (PMID: 24382965)

11. Lu G, Tu J, Jiang R. Case Report: Synchronous pancreatic sarcomatoid carcinoma and gastric cancer: a case study with literature review. Front Immunol 2025;16:1584504. (PMID: 40496866)

12. Zhu Q,Zhu W,Wu J,Chen W,Wang S. Multi-slice computed tomography for the diagnosis of pancreatic sarcomatoid carcinoma. Chin J Dig Surg 2013; 12: 612-615. https://doi.org/10.3760/cma.j.issn.1673-9752.2013.08.013

13. Lu BC, Wang C, Yu JH, Shen ZH, Yang JH. A huge adenosquamous carcinoma of the pancreas with sarcomatoid change: an unusual case report. World J Gastroenterol 2014;20:16381-6. (PMID: 25473201)

14. Dickfos M,Nabi H. Inverted Meckel's diverticulum: a rare cause of adult intussusception. ANZ J Surg 2021;91:1302-4. (PMID: 33074575)